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Meeting of African Science and Technology Experts and Development Planners from Least Developed, Land-Locked and Island Countries in Africa

Mbabane, (Swaziland) - 4 to 7 June 1979

FINAL REPORT

Opening of the meeting

1. The meeting of African Science and Technology Experts and Development Planners from Least Developed, Land-locked and Island Countries in Africa was held at Mbabane, Swaziland, from 4 to 7 June 1979. Opening addresses were delivered by Canon Sipethe Dlamini, Minister for Education of Swaziland; Mr. S. Shahid Husain, Resident Representative of the United Nations Development Programme in Swaziland; Mr. David P.S. Wasawo, Chief of the Natural Resources Division of the Economic Commission for Africa (ECA) and Mr. kwaku Aning, Technical Adviser in the secretariat of the United Nations Conference on Science and Technology for Development.

Attendance

2. The meeting was attended by representatives of the following ECA member States: Benin, Burundi, Guinea, Malawi, the Niger, Swaziland, the United Republic of Tanzania, and the Upper Volta.

3. Observers were present from the secretariat of the United Nations Conference on Science and Technology for Development (UNCSTD), the United Nations Development Programme (UNDP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Opening addresses

4. Canon Sipethe Dlamini the Minister of Education of Swaziland, speaking on behalf of the Government and people of Swaziland welcomed the participants to the meeting. He said the rate of development of a country would depend on its ability to absorb modern science and technology but that it must not be forgotten that

development involved people and that people were more important than machines. There was a pressing need to train people to adapt modern technology to the specific needs of developing countries. Many African countries made a large investment in technical and technological education, which meant that the current meeting was a very important one. Moreover, Africans must be prepared to make changes in their society if they were to be successful in applying scientific and technogical skills to improve the quality of life of both their urban and their rural people while at the same time retaining all the traditional values compatible with a technological society. The purpose of technological development must be to help countries make the most of their human and natural resources. Co-operation among countries with common goals and problems would increase their ability to decide on the role which science and technology would play in the realization of their objectives. He said he was sure the participants in the meeting would find sufficient common ground to be able to present concrete proposals on objectives and strategies to the World Body.

5. The Resident Representative of the United Nations Development Programme in Swaziland pointed out that the participants in the meeting had come to Mbabane to exchange views and develop thoughts that would be conveyed to the Group of 77 for discussion in New York the following week and later on to the Fifth Session of the Preparatory Committee of the United Nations Conference on Science and Technology for development. The purpose of those efforts would be to explore how science and technology could contribute to economic and social development. In view of the serious issues to be debated by the participants, he felt it would be in order to remind them of the historical evolution of science, which had begun in Africa, the Middle East and the Orient before Europe had been civilized and America Europeanized. In the realm of mathematics he mentioned that the discovery of the unit of zero had been made by a mathematician from India one thousand years before Christ and that algebra had been invented by Arabs in Baghdad. In medicine pharmacology, and optics much of the ground-work had also been laid by Indians, Arabs and Egyptians. Moreover, 5,000 years ago the techniques of town planning and architecture had already reached an advanced stage in the Indus Valley and elsewhere in the present day "developing world". Thus, he reminded the participants that their presence at the meeting was an attempt to revive and develop what their ancestors had pioneered many centuries ago. Since then, the discovered knowledge had changed hands and had been put to use where most needed, for which the people of today's First and Second Worlds deserved a rich tribute. Man had now reached a higher level in the understanding of his environment and was speedily developing the technological know-how and skills to put the natural resources of earth to the service of mankind. The purpose of the present meeting was to pursue that goal.

6. The Chief of the Natural Resources Division of the Economic Commission for Africa, speaking on behalf of the Executive Secretary, expressed the gratitude of the Commission to the Government and people of Swaziland for having agreed to host the meeting at very short notice. He also paid a tribute to the United Nations Development Programme (UNDP) for providing the funding that had made it possible to hold the meeting.

7. He reviewed the ground covered so far by the African region in preparation for the United Nations Conference on Science and Technology for Development (UNCSTD). He reminded the participants that the United Nations had designated the regional commissions as focal points for the preparations in their respective regions. Activities were to begin with each member State holding national debates on issues featured in the Conference agenda for the purpose of reaching a national concensus that would be set forth in a national paper. So far ECA had received more than 30 such papers. At the subregional level seminars had been organized, such as the one held at Mbabane in August 1978. At the regional level, a preparatory meeting had been held at Arusha, at which representatives of member States had agreed on the modalities for the preparation of the Draft Regional Paper. That paper has been examined at the Cairo Conference in August 1978, and a programme of action had been agreed upon. As a result of the Cairo Conference, Africa now had a regional paper, which was one of the two major documents available to participants at the current meeting. The other regions had also come up with regional papers, and on the basis of the recommendations contained in all those papers, the UNCSTD secretariat had prepared a preliminary draft programme of action (A/Conf.81/PC.28), which was the second main document available to the participants.

8. As he saw it, the primary function of the current meeting was to address the question to what extent had the recommendations contained in the African Regional Paper been reflected in document A/Conf.81/PC.28. The second question to be addressed was to what extent were the needs of the least developed, land-locked and island countries reflected in that document. Finally, he said that what was required now was the formulation of specific strategies and the identification of concrete projects by people, such as the participants at the meeting, who encountered such problems every day at the country level.

9. The representative of the secretariat of the United Nations Conference on Science and Technology for Development (UNCSTD), reporting on the progress made by the secretariat in its preparations for the Conference said that so far the secretariat had received a total of 125 national papers. Thirty-five of those papers had been received from African countries. He regarded that as a very significant input, which was largely due to the work done by ECA and UNDP.

10. At the third session of the Preparatory Committee held from 22 January to 5 February 1979, the Secretary-General of UNCSTD had submitted a document in which six target areas had been detailed. The members of the Committee had, at that session, decided to reduce those target areas to three, including Target Area A: the strengthening of the scientific and technological capacities of developing countries; Target Area B: the restructuring of the existing pattern of international scientific and technological relations and Target Area C: strengthening the role of the United Nations in the field of science and the provision of increased financial resources. Those three target areas were reflected in the Preliminary Draft Programme of Action (A/Conf.81/PC.28), which participants in the current meeting had before them.

11. During a series of meetings which had begun on 12 March 1979, the Group of 77 had drawn up its own position paper, which had been submitted to the fourth session of the Preparatory Committee when it had opened on 22 May. Unfortunately, African participation at that session had been disappointingly low and had consisted primarily in representation from the delegations in New York whereas it would have been good to have people more conversant with the issues at hand attend directly from the countries concerned.

12. The current meeting was expected to discuss document A/Conf.81/PC.28 comparing it with the African regional paper and also to look at the position paper prepared by the Group of 77 and suggest changes which might be made in it to make it reflect the African position as faithfully as possible. The Group of 77 would be meeting from 11 to 22 June to discuss the position it would take at the Conference, and it was crucial for Africa's position to be reflected in that meeting. The Preparatory Committee would hold its fifth session from 25 June to 6 July 1979, during which the document prepared by the Group of 77 would be negotiated with Groups B and D.

Election of officers

13. The meeting unanimously elected Mr. S. Sibany9ni (Swaziland) as Chairman; Mr. Bepio Celestin Bado (the Upper Volta) as Vice Chairman and Mr. R.D. Thawale (Malawi) as Rapporteur.

Adoption of the Agenda

14. The meeting adopted the following agenda:

1. Opening of the meeting
2. Election of officers and members of drafting committee
3. Adoption of agenda and programme of work
4. Introduction of the African Region's Programme of Action vis-à-vis UNCSTD's Global Programme of Action
5. The presentation of major recommendations of Lomé meeting of African Experts
6. Adoption of the report and closure of the meeting.

PROCEEDINGS

Introduction of the African Region's Programme of Action vis-à-vis UNCSTD's Global Programme of Action (Agenda item 4)

15. The representative of ECA, reviewing the process by which the draft African Regional Paper had been prepared for the Cairo Conference, explained that the procedure followed had been agreed upon at the Meeting of Experts held in Arusha in October 1977. At that meeting it had been agreed that the draft Regional Paper

should be based on (1) national papers submitted by individual member States; (2) professional papers submitted by regional and subregional institutions; (3) expert papers from African specialists and (4) a comprehensive paper drawn up within the United Nations system describing the role of the various United Nations bodies and agencies in the application of science and technology to development. A fifth input, which had not been mentioned at the Arusha meeting, was all the relevant literature available in the ECA library. Those various components had been synthesized into a draft regional paper which had been discussed at two important meetings of experts and, note had been taken of the observations made at those meetings before its presentation at the regional meeting in Cairo. The document was discussed in depth at Cairo, with particular attention paid to chapter VI on a programme of action for the African region, which had been proposed on the basis of the proceeding chapters. It had been decided to set up a committee to assist the ECA secretariat on the preparation of the final paper. The paper incorporated the views expressed at the Cairo conference and in national papers which had not been received when the draft had been prepared.

16. Thus, in the preparation of the regional paper all the procedures laid down in Arusha had been followed, and the paper had been adopted at the Cairo meeting as a document which clearly represented the views of the region. Therefore, the present meeting was being asked to elaborate upon, but not to change, the recommendations contained in the regional paper. It seemed to him that there were two possible lines of attack which the present meeting might adopt. It could consider the programme of action in an attempt to make the recommendations contained in it implementable and it could see to it that those recommendations w were reflected in document A/Conf.81/PC.28. A comparison between the two documents would centre on chapter VI of the African Regional Paper and on the whole of the preliminary draft programme of action.

17. The majority of the recommendations contained in the programme of action were not new but consisted in recommendations which had been adopted previously but had never been implemented. Thus, question arose as to what mechanisms would ensure that recommendations were put into action and did not remain on paper.

18. It should also be borne in mind that although it could be assumed that resources were available for putting the recommendations into action, those resources were not unlimited. The order of priority in which recommendations should be implemented was therefore another matter for serious consideration. He suggested that thought might also be given to the co-relation of the recommendations since some of them now overlapped. Finally, the question of funding had not yet been adequately discussed.

19. In comparing the African Regional Paper with A/Conf.81/PC.28, participants would note that there were areas in which the UNCSTD document reflected the African programme of action quite faithfully but that some of the points made in the African paper had been ignored. Sections A, B, and C of Chapter VI had been adequately reflected whereas sections D - L had been omitted as a result of a policy decision taken at the second session of the Preparatory Committee of UNCSTD to omit recommendations relating to specific sectors.

20. In explaining how A/Conf.81/PC.28 had been put together, the representative of UNCSTD said that following the decision to omit recommendations on specific sectors, the Secretary-General of UNCSTD had decided to submit to the Conference a document dealing with pilot projects of a sectoral nature. If any specific recommendations came out of the current meeting they could be used in drafting that document. With regard to financing he said the present meeting could come up with suggestions which could be chanelled through the Group of 77 at its forthcoming meeting.

Presentation of the major recommendations of the Lomé Meeting
(agenda item 5)

21. The representative of ECA, who had been present at the Lomé meeting, took the floor first to give some background to what had transpired at the Lomé meeting, which had taken place from 21 to 26 May 1979. He said that Africa's participation in the activities preparatory to the United Nations Conferen on Science and Technology for Development had been at a fairly high level of intensity up to and including the regional conference held in Cairo in August 1978, at which the African Regional Paper had been adopted. Subsequently, two other meetings with important implications for Africa's input in the world conference had been held. Those meetings were the Monrovia colloqium entitled "Prospectives of Development and Growth in Africa up to the Year 2000" and the Seminar on Alternative Patterns of Development and Life Styles in Africa. They had been held within the framework of the efforts currently being made within the whole United Nations system to produce a global development strategy for the Third Development Decade. The regions had been invited to indicate their wishes in regard to the formulation of that strategy. The two meetings mentioned had led to the production of an African Strategy for Development, which had subsequently been adopted at the fourth session of the ECA Conference of Ministers held in Rabat in March 1979. In that document consideration had naturally been given to the application of science and technology to development. Much of the Plan of Action contained in the Strategy was based on the African Regional Paper.

22. At the fourth session of the Preparatory Committee of UNCSTD, it had become evident that African enthusiasm in preparing for the Vienna Conference had waned and that the two other large subgroups of the Group of 77 had surpassed Africa in their efforts. A/Conf.81/PC.28 had not seemed to reflect Africa's position adequately, and the Lomé meeting had been called in an attempt to rectify that situation by strengthening Africa's position in the Group of 77. It was important to remember that the Vienna Conference would be concerned not just with science and technology as such but with their application for development. Since national development was reflected through sectoral activities, it was difficult to go along with the decision to eliminate all recommendations pertaining to sectors from the global programme of action to be submitted to the Conference. It was important to Africa that the sectoral approach should be resussitated and given the attention it deserved. The thrust of the Lomé meeting had been to examine the extent to which the sectoral considerations in the programme of action adopted at Cairo could be revived. The Plan of Action adopted by the ECA Conference of Ministers and the recommendations put forward by the Group of 77 had also been

examined in the light of A/Conf.81/PC.28, and it had become clear that Target Area A required very serious attention and that Africa's contribution to the position paper prepared by the Group of 77 was limited in that the paper did not reflect the sectoral approach issue because priorities were not the same in Latin America and Asia as they were in Africa. One important difference was that Latin America put great emphasis on the transfer of technology, whereas Africa wanted to lay greater stress on the indigenous generation of technology.

23. The Lomé meeting had come up with some fairly far-reaching recommendations, and it was hoped that they could be put into a document along with the recommendations to be made at the present meeting and submitted in that form to the African members of 77 for their use at the forthcoming meeting of the Group. At the Lomé meeting the sectoral recommendations made at Cairo had been studies in conjunction with the Plan of Action adopted by the Conference of Ministers in an attempt to short-list areas out of which projects might be identified. The resulting list included the following eight main items, each of which was subdivided into specific areas of action: (1) General (survey and inventory of indigenous technologies and existing science and technological capabilities); (2) institutions for science and technology development; (3) food and agriculture; (4) industrialization; (5) transport and communications; (6) human resources development; (7) natural resources, including energy; (8) housing and urban development, health and sanitation, drought and desertification. Some time had also been devoted to the issue of institutional mechanisms, and a paper on funding had been considered.

GENERAL DEBATE ON AGENDA ITEMS 4 AND 5

24. All of the delegations which spoke in the general debate commended ECA on the document it had produced. One delegation remarked that in considering that paper in the light of the current meeting, it should be remarked that the least developed, land-locked and island countries shared the following characteristics:

(i) They had not yet developed an adequate domestic infrastructure;

(ii) They had no framework for the transfer of technology;

(iii) Their knowledge of technology was insufficient;

(iv) Their negotiating skills were inadequate;

(v) They depended heavily on agriculture.

25. Therefore at the Vienna Conference, they should persuade the developed countries of the need to allocate them the financial resources they needed to develop their agricultural capacities, their cheap energy resources and their transport and telecommunications facilities. They should sollicit the World Bank for special funding to improve their rural housing and urban and suburban infrastructures and develop their own national capacity for self-reliance by ensuring that every technology they received had a training component.

26. Another delegation expressed the view that there was need for countries in the developing world to develop regional co-operation in science and technology by evolving mechanisms for a constant interchange of scientific and technological ideas. He pointed out that so far African countries were working almost independently in science and technology. Indeed, it was not uncommon for African institutions to have closer ties with scientific institutions in the developed countries than with those in Africa even though the results obtained in an African country were likely to benefit other African countries enormously and an interchange was useful in avoiding duplication. He stressed the importance of the availability of technical and scientific manpower and the urgent need for African countries to produce their own manpower. Foreign technicians were useful, but when they returned to their own countries, there was nobody to take over. He felt that in UNCSTD special attention should be given to the education of local personnel to fill responsible positions.

27. He noted that decisions were adopted at international meetings, but that there was no follow-up on them and expressed the hope that the Vienna Conference would not follow that pattern. He was glad to note the presence of an UNCSTD representative at the current meeting, who would report back to New York on the conclusions reached. He hoped that Vienna would mark not the end but the beginning of action in the realm of the application of science and technology to development.

28. He also felt it was important to provide some institutional mechanism to ensure that the decisions of the Conference were followed up and in that connexion suggested that the OAU Science and Technical Research Council and the Science Council of Africa might work hand in hand with ECA.

29. It was at this point that a consensus began to emerge on the importance of the training of manpower, especially in respect of managerial positions.

30. One delegation said that in the Vienna Conference the African region should press in particular for:

(i) A redistribution of the world's productive potential;

(ii) Rationalization of patterns of consumption and elimination of waste;

(iii) A deliberate attempt to finance the projects of the least developed, land-locked and island countries;

(iv) The development of a new outlook in respect of co-operation between the developed and the developing countries in that the developed countries should help the developing countries to produce their own indigenous technologies.

31. In connexion with the need for training, one delegation remarked that many least developed countries faced the problem of inadequate basic education. He also felt that the Vienna Conference should give serious thought to measures for the application of decisions taken at the Conference on Desertification, which was a crucial problem for many African countries.

32. The same delegation noted that the three target areas selected by the Preparatory Committee constituted preliminary measures that had to be taken before action could be taken at the country level. However, the real need was for sectoral action, and he felt that the programme of action should concentrate on that.

33. One representative said that all the recommendations made in the Cairo document corresponded to changes that were actually being made in his country and that the implementation of most development projects depended on the amount of progress made in the areas of training and research. There was a priority need for most of the least developed countries to rethink their system of education because it was necessary to change the mentality of those responsible for implementing development projects. There was also a need for those countries to amend their structures and to define the development strategy in which science and technology would be applied. The structures should be conceived in terms of the recommendations. He also mentioned the need for increased co-operation between coastal and land-locked countries with a view to facilitating transport and communications projects at the regional level.

34. The representative of ECA pointed out that the Cairo document indicated the broad requirements of Africa, even mentioning areas in which steps might be taken to ensure that science and technology had an impact. Some such steps had already been taken in that programmes and projects had been decided upon. He felt the meeting might wish to review the progress made so far with a view to determining whether those programmes and projects should be presented to the international forum.

35. In that connexion he mentioned the African Regional Food Plan adopted at Arusha, which contained important scientific and technological components and was in fact an elaboration on what had been set forth in the African Regional Paper. In connexion with forestry, he pointed out that an impressive man-made forest existed in Swaziland itself and said that that experiment might be adduced in connexion with the problem of the kind of infrastructure to provide to other countries. He also mentioned that the World Conference on Water Resources had come up with an action programme which was to a large extent based on the African Regional Paper and that the African region now had its own action programme on the development of water resources in all its aspects. He wondered whether the African region could present that follow-up document to the Vienna Conference with the suggestion that it provided the components of water resources development in Africa, for the implementation of which resources would be required from the international community. Africa had also decided to set up a Regional Centre for Technology. That decision might also be taken before the World Conference on Science and Technology as one area in which Africa needed assistance from the international community and from the developed countries in particular. In the same connexion he also referred to the African Regional Remote Sensing Organization, the arrangements for standardization and quality control, the projected network of engineering faculities, the higher technical training and research institute

and the Centre for Industrial Design and Manufacturing. It could be said that Africa had projects but no sources of funding or technical assistance for them. As he saw it, those projects were the flesh and the skeleton of the Cairo document. As far as the least developed countries in particular were concerned, their problems were problems of scale rather than of kind.

36. One participant said he agreed entirely with the representative of ECA although he felt his statement had not given enough attention to health and sanitation, which was one of the main factors in the predicament of the least developed countries. WHO was doing work in connexion with preventive services, but more was required. Secondly, he felt that more attention should be paid to housing. In that connexion he said the decisions taken at Habitat had not had much impact in the least developed countries. In his view housing was of paramoung importance, and the World Bank should allocate funds to that sector unconditionally leaving it to the countries concerned to distribute them among rural and urban projects. Thirdly, he said that transport and communications should be given second priority after training. There was no adequate network of roads and railroads to the land-locked countries, and funds should be released to alleviate the problems of those countries.

37. Another participant said she felt there was urgent need to formulate a specific strategy on training aimed at overcoming the manpower shortage. It was not enough just to have a training component in each individual project.

38. In reply, one participant cautioned that training for its own sake was meaningless. Training had to be tied to projects; otherwise there was danger of brain drain.

39. An ECA representative said that training had been given considerable attention at Lomé and that it had finally been decided to consider the whole issue under "human resources development".

40. One participant said that if the African region decided to endorse the need for strengthening of manpower as opposed to the emphasis laid by the other developing regions on the transfer of technology, training should be given as much attention as possible, and by training he said he meant all kinds of education from primary school on up. All people, even farmers, needed to know how to read and write. Secondary school leavers should also be given the attention they deserved, and the need for highly qualified personnel was obvious. It was necessary to identify the training needs of the African region and for each country to learn from the mistakes of the others. He had no objections to Africa's not giving priority to the transfer of technology, which often victimized African countries and made them over-dependent on the developed countries. He felt that at the Vienna Conference, African countries should bargain for fair terms of transfer of technology and that in general they should vet the kind of technology they were receiving.

41. One representative stressed that training should always conform to a given strategy. An effort should be made to gear training to the problems confronting a country. There was a need to define the type of education required.

42. The need to sensitize students to the modern technological outlook was mentioned as was the problem that most students did not wish to become teachers. The teaching profession needed to be upgraded and some incentive schemes for teachers provided.

43. A member of the secretariat said it seemed it was generally agreed that priority should be attached to training and education and pointed out that the Cairo paper had also given high priority to that sector, putting it second only to political commitment. The question now was what was being done in specific areas of education and training and whether there was a case for regular exchange in that area. Was the progress being made in one country of relevance in other countries. He suggested that participants should look at the recommendations contained in section B of Chapter VI of the Regional Paper to see whether they could suggest ways of giving them more body, addressing themselves to such questions as which areas should be given priority, what kind of bottlenecks were being encountered and what kind of strategy might be suggested.

44. A representative of ECA suggested that another document which might be useful in tackling the task before the meeting was contained in annex II to the report of the Cairo meeting (E/CN.14/ECO/160). That annex contained the resolutions adopted at a meeting of the least developed countries held immediately prior to the African Regional Meeting.

45. A representative said that in his country training was given such importance that it took precedence over development of natural resources with which the country was well endowed. He felt there were too many myths associated with the transfer of technology and that greater emphasis should be placed on access to science and technology. Increased training facilities would allow African countries to achieve self-reliance. Consideration should also be given to ways of applying science and technology for the benefit of the masses. He wondered whether it might be possible to establish an institution in Africa, perhaps under United Nations auspices, which could help African countries to deal with the problem of the application of science and technology to development.

46. The idea of an organ responsible for co-ordinating all activities related to the application of science and technology in Africa was supported by a number of delegations. It was felt that such an organization could mobilize funds from outside the continent and channel them to regional institutions such as the African Regional Centre for Technology and the Remote Sensing Organization. One participant suggested that there was also a need for a machinery to consider the problem of the educational system as a whole.

47. The representative of UNCSTD drew attention to Resolution 6 of the African Regional Meeting, which recommended the restructuring of the Science and Technology Unit of ECA with a view to carrying through on the decisions taken in Vienna.

48. A member of the secretariat said that the sense of the discussion seemed to be that training and education had been selected as the priority area and invited suggestions from the participants as to projects in that sector at the national, regional and international levels.

49. In reply a participant said that it should be borne in mind that the goal sought at the Cairo Conference was to strengthen the capacity of States to utilize science and technology more effectively. With that in mind he put forward the following priorities in the order given: (1) strengthening of structure; (2) training; (3) food and agriculture; (4) transport and communications.

50. Another participant said in connexion with training that a recommendation for action at the national level should concern the training of trainers in the fields of science and technology. That was an area in which not much had been done in Africa, where there was too much reliance on trainers from outside. He also felt that existing training institutions at national level should be strengthened and that some thought should be given to the categories of skills in which training should be offered. At present most training institutions did not offer a wide enough range of subjects to cope with rural transformation. As for a training strategy, he suggested that efforts should be made at the national level to centralize training in science and technology with a view to cutting down on expenditure.

51. A priority which was related to training and which might even take precedence over it was research. A proper research policy was needed at the national level so that the problems faced could be identified.

52. The meeting agreed that it was not entirely happy with document A/Conf.81/PC.28 in that it did not go far beyond general considerations and did not take account of individual sectors.

53. A member of the secretariat suggested that the participants should tackle the task of ranking the sectors covered in the regional paper in their order of priority and then, if enough time remained, that they shall attempt to rank the projects suggested under each sector.

54. In reply to that suggestion, a participant said that any order of priority which could be given to the sectors would be purely arbitrary. Education was a matter of top priority because the future depended on it, but agriculture was also a priority because the majority of Africans were engated in it. That comment was endorsed by another participant, who said that the question of priorities would depend on the political commitment of each country. His Government had given priority to the eradication of ignorance, poverty and disease, and placed great emphasis on basic education with a view to wiping out illiteracy. It also stressed the training of trainers and technical and agricultural education. The main proglem it faced in achieving its goals in those areas was lack of resources, and it was there that intra-regional and international co-operation was needed. In the eradication of poverty, account was taken of such sectors as agriculture, natural resources, industry and transport and communications; and health and sanitation, housing and water were related to the eradication of disease.

55. One participant suggested that a working group should be set up to co-ordinate the views which had been expressed in the meeting and to list the sectors by order of priority, suggesting the strategy to be followed in each sector.

56. A drafting group of three was accordingly established under the chairmanship of the Vice-Chairman of the meeting, on the understanding that contributions to its work could be made by any participant in the meeting.

57. That group, which was joined by four other delegations and was also assisted by the ECA secretariat in the performance of its task, accordingly prepared a recommended strategy for the application of science and technology in Africa and submitted it to the Meeting, which expressed its appreciation for the very comprehensive list of priorities proposed.

58. Before the plenary meeting began to consider the document, a member of the group explained that in listing the eight sectors, the group had not meant to imply any order of priorities. All eight sectors were priority areas.

59. The representative of UNESCO remarked that in the strategy reference was made to the need to implement the recommendations of the United Nations Conference on Desertification. He felt the document would be improved by spelling out those strategies and recommendations which were specifically related to Africa. That suggestion was accepted, but since the document in question was not available in Mbabane, it was agreed that the secretariat would make the necessary changes in the document when it returned to Addis Ababa.

60. With regard to the section on natural resources and energy, the representative of UNESCO said his organization would be interested in learning what African experts felt were the prospects of the development of nuclear energy in Africa. During the discussion on the section on education, training, information and human resources development, one participant expressed the view that at the Conference, African delegation should emphasize that the best place for educating and training Africans was in Africa. Another participant stressed the immediate need for better machinery for co-ordination among African universities and for recruiting personnel for them from other African countries. The representative of UNESCO suggested that that need might best be met by the Association of African Universities.

61. The meeting adopted the strategy recommended by the drafting group with a number of amendments. The amended version is contained in Annex I to this report, it being understood that the changes suggested by the representative of UNESCO as mentioned above will be made by the secretariat as soon as possible.

62. The meeting then turned its attention to the question of what machinery should be established to ensure that the recommendations and decisions taken at the Conference on Science and Technology for Development as they pertained to Africa were followed up.

63. A member of the secretariat explained that follow-up action would be at three levels: national, regional and international. National programmes would be the responsibility of national Governments. Follow-up at the regional level could be left in the hands of ECA, and particularly its Science and Technology Unit, and the OAU Scientific and Technological Research Council. However, in the case of follow-up at the international level, considerable thought was needed.

64. In that connexion the representative of UNCSTD said it was generally agreed that there was no need to create a new institution. The Group of 77 was considering the idea of a 3-tier mechanism, i.e. an intergovernmental machinery with universal participation. The idea that the Economic and Social Council might perform that function had been broached, but the Council had only 54 members. It had, however, been suggested that it be restructured to make its membership universal.

65. The second level in this mechanism was that of secretariat support. It was felt that such support might come from the office of the Director-General for International Economic Co-operation and Development, which would mean that the Office of Science and Technology, would have to be expanded to give leadership at a higher level than it now had in order to provide it with greater leaway.

66. The third level in the proposed mechanism consisted in the global financial arrangements described in document A/Conf.81/PC/CRP.2/Add.1/Corr.1, copies of which had been distributed to the participants. The Group of 77 intended to elaborate on those arrangements at its forthcoming meeting.

67. It was decided to set up a 3-man working group to consider the kind of follow-up mechanism the meeting might wish to advocate and to ask that group to report back to the meeting on its findings.

68. In introducing the document prepared by that working group, its Chairman explained that it contained recommendations for follow-up mechanisms at the national, regional and international levels and that those recommendations were based on recommendations contained in the African Regional Paper and in the two UNCSTD documents relating to the position of the Group of 77 (A/Conf.81/PC/CRP.2/Add.1 and Add.1/Corr.1).

69. The recommendations prepared by the working group were then read out to the meeting, which adopted it unanimously. That document is contained in Annex II to this report.

Adoption of the report of the meeting

70. The participants adopted the draft report submitted to it.

Closure of the meeting

71. The meeting was officially closed by Mr. S. Sibanyoni, Head of Civil Service, Cabinet Office of the Government of Swaziland.

RECOMMENDED STRATEGY FOR THE APPLICATION OF SCIENCE AND TECHNOLOGY TO DEVELOPMENT IN AFRICA

The United Nations Conference on Science and Technology for Development emphasis on Development within the background of the New International Economic Order.

Science and technology is recognized as occupying the vital role in solving social and economic problems for national development.

With this view in mind it is recognized further that sectoral programmes are the spearhead strategies through which development can be brought about.

The following is the priority area list of the sectors to be considered:

1. Education, Training, Information and Human Resources Development
2. Agriculture and Rural Development
3. Health and Sanitation
4. Transport and Communication
5. Housing and Urban Development
6. Natural Resources including Energy
7. Industrialization
8. Environment

1. EDUCATION, TRAINING, INFORMATION AND HUMAN RESOURCES DEVELOPMENT

(i) Each African country should strive to obtain the political commitment to implement the recommendations made at the national level in the Programme of Action on this subject particularly in the following:

(a) Training of the trainers in the field of science and technology and the provision of adequate incentives to science and technology teachers.

(b) Reform and restructuring of education and training curricula at all educational levels to match the structure/pattern of development in both urban and rural areas with particular emphasis on basic education for all.

(c) Establishment and strengthening of institutions for the training of craftsmen and technicians, agricultural and management manpower.

(d) Establishment of linkages among universities and research institutes and production enterprises.

(e) Encouragement of more women in science and technology careers.

(f) Skill development and diffusion for out-of-school population including drop-outs.

(g) Co-ordination in the use and deployment of various cadres of staff and the popularization of science and technology among the masses.

(ii) Establishment and support for Regional Institute for Higher Technical Training and Research;

(iii) Encouragement and support for Regional Networks such as the UNESCO African Network of Scientific and Technical Institutions (ANSTI);

(iv) Exchange programmes for students and teachers of science and technology;

(v) Training and fellowship programmes for Africa;

(vi) Effective assistance and support for the Documentation and Information Centres in the Region;

(vii) Development of industrial and technological manpower to cover the entire spectrum of the various skills and expertise required at the various stages of the industrial development process; and

(viii) Promotion of national languages for the more rapid dissemination of information to people who have not benefited from higher education.

2. AGRICULTURE AND RURAL DEVELOPMENT

(a) Implementation of the African Regional Food Plan prepared by the FAO Intergovernmental Meeting which was held in Arusha, 1978 at the national and regional levels.

(b) Formulation of a strategy for rural development based on, among others, the development of agriculture and agro-based industries.

(c) Establishment of education and training centres for supervisory, extension and other workers in agriculture and the creation of regional agricultural research stations.

(d) Development of favourable terms of trade particularly in relation to the prices of primary and processed agricultural products.

(e) Preferential treatment for African countries with regard to the sale and supply of oil, fertilizers and pesticides.

(f) Development of new breeds of animals and strains of crops suitable for Africa and utilization of the findings and products for control of animal and crops diseases specific to Africa and strengthening the existing centres.

(g) Better co-ordination of national and regional research institutes and activities.

(h) Preferential treatment on agricultural development for countries prone to frequent droughts and desertification.

(i) The adoption and use of storage techniques and the installation of equipment for the preservation of agricultural foodstuffs.

(j) The conversion of animal or other organic waste into fertilizer.

3. HEALTH AND SANITATION

(a) Improvement of national health planning implementation and education and the development of appropriate health technology.

(b) Support for and extension of the OAU programmes in research in medicinal plants.

(c) Control of transmissible diseases at subregional and regional levels, and promotion of preventive health services; e.g., the setting up of health and nutritional centres as well as family planning units.

(d) Establishment and improvement of training institutions for medical, paramedical and nursing personnel.

(e) Production of pharmaceutical products from local raw materials.

(f) Expansion and improvement of medical and nursing services and facilities for both urban and rural areas.

4. TRANSPORT AND COMMUNICATIONS

Implementation of the African regional Programme of Action in the United Nations Transport and Communications Decade, which, inter alia, includes:

(i) Assistance in the implementation of the trans-African highway network programme and the PANAFTEL network;

(ii) Development and improvement of inland waterways and maritime shipping and efficiency of port operations;

(iii) Development and improvement of national, subregional and regional telecommunications networks and services;

(iv) Strengthening of national railway transport and development of methods to achieve the linking of railway systems of different technical specifications and establishment of an African rail network;

(v) Establishment of intra-African airlines and improvement of air freight and air mail;

(vi) Establishment of joint training centres and servicing and repair facilities;

(vii) Improvement of regional air services through better co-ordination of the schedules of the various national airlines, and the establishment of multinational (or subregional) airlines;

(viii) Strengthening of national and regional research institutions;

(ix) Construction of farm-to-market roads in rural areas.

5. HOUSING AND URBAN DEVELOPMENT

(a) Formulation of effective and reasonable urbanization and habitation policies which will take into account high and low density dwelling areas.

(b) Promotion of the establishment of small-scale manufacturing units for the production of building materials and components at the national, subregional and regional levels.

(c) Establishment and/or strengthening of research institutions for local building materials.

(d) Formation of indigenous consulting organizations to help to develop appropriate techniques in the areas of design and construction and to promote the effective transfer of technologies relevant to local needs.

(e) Provision of adequate utilities in particular water, sewerage and waste disposal systems.

(f) Strengthening of selected national training centres for personnel in tropical architecture, urban planning, building and construction technology for regional training.

(g) Establishment of Regional Training Centres for architects, town planners and designers.

6. NATURAL RESOURCES INCLUDING ENERGY

(a) Survey, inventory and management of natural resources (energy, water, forests etc.), and in particular, support for the Regional Centre for Training in Aerial Surveys in Nigeria and the Regional Centre for Services in Surveying and Mapping in Kenya.

(b) Encouragement and support for the African Remote Sensing Centres and the Training and User-Assistance Centres in the region.

(c) Encouragement and support for the subregional Mineral Resources Development Centres.

(d) Rural electrification.

(e) Development of non-conventional and new sources of energy.

(f) Implementation of the ECA Conference of Ministers resolution on the establishment of a Regional Centre for Solar Energy.

(g) Creation and promotion of African multinational companies and institutions for the exploitation of mineral resources and utilization of energy and water resources.

(h) Establishment and support for the Regional Centre(s) for Marine Science and Technology.

(i) Support and strengthening of River Basin and Lake Basin Commissions in the region.

(j) Implementation of the recommendations of the African Regional Meeting on the Follow-up to the Mar Del Plata Conference on Water Resources at the national and regional levels.

(k) Development and implementation of programme of forestation and afforestation particularly in the Sahelian areas of the region.

(l) Development of fisheries including preservation of fishery products.

7. INDUSTRIALIZATION

(a) Establishment and support for the Regional Centre for Industrial Design and Manufacturing.

(b) Support for the Regional Centre for Technology.

(c) Support for the African Regional Organization for Standardization.

(d) Promotion of indigenous industrial enterpreneurs especially in the small-scale industrial sectors and the production of capital goods.

(e) Establishment and support for regional Patent Documentation Centres.

(f) Establishment of local indigenous consultancy in the field of industrialization.

(g) Support for interregional co-operation in industrial technology

(h) Promotion of interregional and intra-African trade.

8. ENVIRONMENT

(a) Implementation of the recommendations of the United Nations Conference on Desertification at all levels.

(b) Conservation of natural resources to combat deforestation, soil loss; and degradation, desertification, mineral depletion and salinization of arid farm lands.

(c) Establishment and development of alternative sources of Energy to alleviate the over dependence on fuel wood which is being fast running out.

(d) Establishment of an international special fund to assist any African country which is affected by drought and other natural disasters.

(e) Support for all efforts on research relating to the establishment of networks for monitoring and predicting natural disasters well in advance so that countries can take appropriate measures in good time.

(f) Development of effective mechanisms for the control of pollutants due to human waste disposal, excess fertilizers and pesticides.

(g) Establishment of laws and by-laws for the control of marine pollution and the protection of beaches.

(h) Establishment and enforcement of laws on industries that should ensure that industrial effluents are treated before they are dumped into the biosphere i.e. water bodies and the atmosphere.

IMPLEMENTATION MECHANISMS

NATIONAL LEVEL PLAN

That each country should make firm political and financial commitments to the application of science and technology for development and seek the implementation of national policies on the same by taking the following action:

A. By the creation and/or strengthening of a national organization for science and technology at the highest level with the responsibility of:

i. advising the government on policy and priorities in science and technology;

ii. creating an informed public in science and technology matters, through intensified action for the popularization of science and technology, for example by highlighting the role of science museums and science programmes in the media and infusing interest in handicrafts and science models while making their supplies inexpensively available to as wide a sector of the population as possible;

iii. integrating the role of social sciences and the humanities in the process of over-all development, particularly for the prevention and treatment of the social ill-effects of new technologies, while working towards the preservation of the cultural identities of the nations of the region;

iv. establishing or strengthening of existing national science and technology information and documentation services, including patent services;

v. promoting regional and international co-operation in science and technology, notably to strengthen scientific and technological co-operation among developing countries;

vi. establishing of basic national scientific and technological services such as standards, quality control, testing and callibration;

vii. advising local education and training bodies and making projections for building up a capacity in human resources for science and technology for development.

B. To mobilize and/or secure funds and to allocate them to the various science and technology institutions in light of national development priorities. (in order for the body to function properly).

REGIONAL LEVEL PLAN

A. That UNDP, UNESCO, ECA and OAU should make an inventory of regional institutions concerned with science and technology before suggesting how to establish new institutions or strengthening the existing organizations;

B. That ECA should be responsible for the follow-up and implementation of all the Vienna Conference decisions in the African Region;

C. That the Science and Technology Unit of the ECA should be strengthened by the provision of more resources and manpower to carry out these activities and future intra-regional activities.

INTERNATIONAL LEVEL PLAN

A. That a supreme body for science and technology should be set up within the UN by expanding, upgrading and/or restructuring of one of the existing bodies such as ECOSOC;

B. That global financial arrangements for a science and technology fund should be mobilized (by the General Assembly) from all sources in order to implement the decisions of the supreme body.